

Analyzing Extreme Quantitative Precipitation Forecast Performance

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Extreme precipitation events (i.e., those events associated with the tail end of the precipitation probability distribution) are high impact events that can cause loss of life, damage to property, and significant disruption to local, regional, and even national economies. The Hydrometeorology Testbed (HMT) was established in 2003 to address the scientific and practical challenges associated with forecasting extreme precipitation to help improve operational forecasting skill. A key driver of the HMT was the recognition that the current metric (i.e., threat score) and precipitation threshold (1.0 in 24 h⁻¹) used for NOAA's Government Performance and Results Act (GPRA) to assess annual national quantitative precipitation (QPF) forecast skill by NCEP's Hydrometeorological Prediction Center (HPC) are inadequate for monitoring and analyzing extreme precipitation forecast performance.

In collaboration with the HMT at NCEP's HPC (HMT-HPC), and utilizing the Developmental Testbed Center's (DTC) verification software, this study examines HPC QPF performance for extreme events over an 11 year period (January 2001 through December 2011.) Leveraging lessons learned from extreme QPF verification over the HMT-West domain, extreme precipitation event thresholds are quantitatively defined for each National Weather Service (NWS) River Forecast Center (RFC) region and applied to the continuous United States. With these thresholds, various verification metrics are used to analyze extreme QPF performance by domain (e.g., nationally and regionally), by lead time (e.g., 24 h, 48 h, and 72 h), and by season (e.g., cool versus warm season.)

This presentation will highlight the results and challenges (e.g., sample size) of the analysis of HPC extreme QPF performance by domain, lead time, and season. In addition, it will address research-to-operations (R2O) outcomes (e.g., identification of operational forecast gaps and potential internal HPC measures of extreme rainfall performance.) Finally, this presentation will outline connections the upcoming southeastern HMT (HMT-SE) Pilot Study (2014) and the Intense Precipitation and Flash Flooding Experiment (2013) being conducted by the HMT-HPC and the National Severe Storms Laboratory (NSSL).